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The effects of cycling cadence of subsequent running performance in triathlon, taken from:

Bentley (2008) Maximising performance in triathlon: Applied physiological and nutritional aspects of elite and non-elite competitions. *Journal of Science and Medicine in Sport*. 11, 407-416.

All aspects of triathlon, cycling and running performance are analysed for the benefits of elite competitors, but whether you are elite or mid-pack age group, we can all learn a little from reading the research. What fascinates me the most is how some things we take as 'common knowledge' can be turned on their heads by research and those things we thought we knew the answers to.. well.. sometimes we need to open our minds a little and look again.

Bentley et al (2008) completed a review of triathlon research and identified key areas of interest relating to performance. The review ranged from wetsuit swimming to nutrition and one of the most interesting sections of the paper involved cadence on the bike and running performance.

Research has shown that the metabolic cost of running increases as exercise continues. In simple terms, the amount of energy it takes and the amount of oxygen you consume are higher for the last mile than they were in the first because you are more tired at the end, this occurs even if you run the same speed for each mile. Research has also shown that this effect is much greater in a triathlon event where competitors start the run in a fatigued state, compared against a running event only where competitors start in a fresh state. The final key finding is that elite athletes suffer less than age group athletes and are affected less by the above, it's likely that age groupers will therefore feel the effects of fatigue in the latter part of the run more than elite competitors.

In studies which focused on the effects of drafting during the cycle section on subsequent running performance, there were no surprises to find that running performance improved by approximately 4% compared to non-drafting. Considerably less work had to be done on the bike when drafting and this influenced the subsequent run performance. The key thing to take from this is that the intensity you choose during the cycle stage has a direct effect upon running performance.

One of the most interesting aspects of the review related to the chosen pedal cadence and how this affected subsequent running performance. It is well documented that lower cadences lead to lower oxygen usage and studies have shown that pedalling at lower cadences in the final stages of a triathlon cycle section can improve subsequent running performances. Vercruyssen et al (2002) showed that running performance was significantly improved by adopting a slower cadence for the final 10 minutes of the cycle leg (74 RPM) compared to a self chosen

cadence of 94 RPM and a high cadence of 109 RPM. In addition, Bernard et al (2003) showed that subsequent 3000m running time improved as cycling cadence was reduced from 100 RPM down to 80 RPM and then reduced further to 60 RPM for the cycle section prior to running. Gotshall and Palmer (2002) did show that running performance was better following higher cadence cycling of 109 RPM compared to 90 and 71 but these results should be read with caution as the cyclists were instructed to ride at the same HR for each of the 3 trials as opposed to the same power output and it is known that higher cadences generate higher HR. Based on this, the cyclists riding at 109 RPM may well have been producing lower power output whilst riding at the same relatively high HR as the other two cadences and it is power output which determines how quick your ride, not average HR.

It is generally recommended that cycling at 90rpm throughout the cycle stage of a triathlon is the optimal cadence and much of this is based upon anecdotal evidence and the simple link between 90 revolutions per minute and 180 foot strikes per minute which is the widely recommended running cadence. From this review it is likely that trialling a number of different cadences for at least the final 10 minutes of the cycle section may well be a worthwhile activity. The simplest way to implement this is to do a turbo brick session completing 4X5 minutes on the bike with 3 minute running following each 5 minute cycling interval. Select high cadence for intervals 1&3 and low cadence for intervals 2&4 and see which allows you to run faster and smoother. You must ensure that the power output or cycling speed is the same for each of the 5 minute cycling intervals.

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